In the Claims:

1. (Previously Amended) An implantable cardiac stimulation device that provides therapeutic electrical stimulation to the heart of a patient, including a left atrium and a right atrium, the device comprising:

a left atrial lead adapted to be implanted within the patient so as to provide therapeutic stimulation to the left atrium;

a right atrial lead adapted to be implanted within the patient so as to provide therapeutic stimulation to the right atrium;

one or more sensors that are collectively operative to sense activity associated with the left and right atria and to provide left and right atrial signals indicative thereof; and

a processor in electrical communication with the one or more sensors and that receives signals from the one or more sensors, wherein the processor is operative to evaluate frequencies of the left and right atrial signals and, if one of the left and right signals has a higher frequency, the processor determines the atrium with the higher frequency to be a source of atrial flutter, wherein the processor is operative to control a pulse generator to initiate delivery of the therapeutic stimulation via the left or right atrial lead to the atrium determined to be the source of atrial flutter.

2. (Previously Amended) The device of Claim 1, further comprising a memory in which the left and right atrial signals can be stored for subsequent evaluation by the processor to determine the source of origin of the atrial flutter.

3. (Previously Amended) The device of Claim 2, wherein the processor initially evaluates frequency and timing characteristics of the left and right atrial signals to determine the source of origin of the atrial flutter and, if neither the frequency nor timing indicates the source of origin, the processor evaluates the stored left and right atrial signals to determine which atrium signal exhibited an initial flutter event and the processor determines the atrium having the initial flutter event as the source of the atrial flutter and applies the therapeutic stimulation to that atrium.

4. (Previously Amended) The device of Claim 1, wherein the processor determines the frequencies of the left and right atrial signals as the inverse of the interval between detected left and right atrial depolarizations.

5. (Previously Amended) The device of Claim 1, wherein the processor evaluates the respective frequencies of the left and right atrial signals and, if the respective frequencies exceed a pre-selected threshold, the processor determines that the respective atrium is in fibrillation and then induces the application of the therapeutic stimulation to the respective atrium.

6. (Previously Amended) The device of Claim 1, further comprising memory for storing and threshold, wherein the processor evaluates the relative timing of the left and right atrial signals and, if the timing of one of the atrial signals precedes the other atrium signal by a threshold amount less than an interval between flutter events in one or more preceding cycles for a plurality of determined flutter events, then the processor determines the atrium corresponding to the atrium signal having the less preceding flutter events to be the source of the atrial flutter and induces the delivery of the therapeutic stimulation to that atrium.

7. (Currently Amended) The device of Claim 6, wherein the threshold stored [[n]] in memory comprises the flutter events of one atrium depolarization preceding the flutter event of the other atrium depolarization in a current cycle by an amount less than 40 percent of an interval between flutter events in one or more preceding cycles.

8. (Previously Amended) The device of Claim 1, wherein the therapeutic stimulation comprises a plurality of successive electrical pulses applied via at least one of the left and right atrial leads.

9. (Previously Amended) The device of Claim 8, wherein the therapeutic stimulation comprises a plurality of stimulation parameters including an amplitude, pulse width, interpulse interval, and number of pulses applied and wherein at least one of the stimulation parameters is programmable.

10. (Previously Amended) The device of Claim 8, wherein the pulse generator applies the therapeutic stimulation synchronously with respect to intrinsic events sensed on at least one of the sensed left and right atrial signals.

11. (Previously Amended) The device of Claim 1, further comprising at least one ventricle lead and at least one sensor that senses activity in at least one ventricle wherein the implantable cardiac stimulation device is adapted to deliver ventricular therapeutic stimulation to at least one of the ventricles of the patient's heart.

12. (Previously Amended) An implantable cardiac stimulation device that provides therapeutic electrical stimulation to the heart of a patient, including a left atrium and a right atrium, the device comprising:

means for sensing signals from the left and the right atria;

means for determining a source of origin of a combined atrial event wherein the determining means receives signals from the means for sensing, wherein the means for determining comprises means for evaluating frequencies of the left and right atrial signals to determine an originating atrium; and

means for delivering atrial flutter therapeutic stimulation to the originating atrium.

13. (Original) The device of Claim 12, wherein the means for sensing comprises electrodes implantable in the patient's heart for communication with the left and right atria.

14. (Original) The device of Claim 12, wherein the means for sensing comprises at least one sensor implantable in the patient's heart.

15. (Previously Amended) The device of Claim 12, further comprising means for detecting fibrillation when the frequencies of the left and right atrial signals exceeds a pre-selected threshold.

16. (Withdrawn) A method of determining the source of origin of an atrial flutter event using an implantable device, the method comprising:

evaluating flutter events of a flutter signal for both the left and right atria to determine the frequencies of the flutter signals; and

determining that the flutter signal having the highest frequency indicates that the corresponding atrium is the source of origin of the atrial flutter.

17. (Withdrawn) The method of Claim 16 further comprising: determining whether the frequency of the flutter signals in the left and right atria is substantially equal; and if the frequency of the flutter signals is substantially equal, evaluating the relative timing of the flutter events of the left and right flutter signals to determine if a delay between left and right atrial flutter events for a current cycle is less than a determined amount different than delays in one or more preceding cycles to determine the origin of flutter.

18. (Withdrawn) An implantable cardiac stimulation device comprising:

a plurality of implantable sensing and stimulation electrodes in communication with cardiac tissue of the left atria (LA) and right atria (RA);

an implantable pulse generator in communication with the stimulation electrodes; and

a microcontroller in communication with the sensing electrodes so as to receive signals therefrom, wherein the microcontroller is operative to evaluate signals received from the sensing electrodes, determine indications of tachycardia and, upon detection of a tachycardia, automatically evaluate stability and relative frequency of signals from the LA and RA and attempts to determine an atrium of origin of atrial flutter and, upon determination of an atrium of origin, and controls the pulse generator to apply stimulation to the atrium of origin.

19. (Withdrawn) The device of Claim 18, wherein the device determines a LA origin of flutter if LA and RA rates are unequal and stable.

20. (Withdrawn) The device of Claim 18, wherein the device determines a RA origin of flutter if the LA and RA rates are approximately equal and delay of RA to LA observed events is a determined amount less than that of a previous interval.